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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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GROUP 1700

Application Number: 10/612,490
Filing Date: July 02, 2003
Appellant(s): SCHLAG, HARALD

Cary W. Brooks
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 24 October 2006 appealing from the Office action mailed 3 July 2006

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 3,623,913	Adlhart et al.	9-1969
US 5,740,941	Lemelson	4-1998

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-12 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adlhart et al. (3,623,913) in view of Lemelson (5,740,941).

Claim 1: Adlhart et al. in Figures 1-4 disclose a product (1) comprising two spaced apart fuel cell bipolar plates (6), each bipolar plated having gas flow channels (grooves) and a protective coating on the bipolar plates, and further comprising an electrolyte membrane (4) interposed between the two spaced apart fuel cell bipolar plates (col. 4: 48-col. 6: 68).

Adlhart et al. further disclose on col. 3: 64-73 "In selecting a suitable material of construction for the bipolar plate, the corrosive environment of the fuel cell and the electrical and thermal conductivity of the material and its cost are considerations. Where weight is also a factor, the plate is suitably constructed, **for example**, of aluminum or magnesium having a protective coating, **e.g.** gold. Other suitable materials include titanium, niobium, tantalum, and alloys, nickel-tantalum, tantalum-niobium, and graphite, carbon containing plastic composites, and the like.

The disclosure "**e.g.**" have been construed as non-limiting and can comprise other suitable protective coatings for providing protection against the corrosive attack by the electrolyte, and the disclosure "**for example**" have been construed as non-limiting and can comprise other materials of construction which can be determined by one skilled in the art as taught by Adlhart et al. on col. 3: 8-17).

However, Adlhart et al. do not disclose a doped coating comprising at least one of a doped diamond coating or a doped diamond-like coating.

Lemelson in Figure 2 discloses a conductive component comprising a metal part (50) having a doped coating (51) in the form of at least one of a doped diamond coating and a doped diamond-like carbon coating (col. 1: 36-41, col. 2: 34-42, and col. 7: 11-col. 9: 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the bipolar plate of Adlhart et al. by substituting the protective coating with the doped diamond coating or doped diamond-like carbon coating of Lemelson because Lemelson teaches a coating that would have provided new and improved structures in articles of manufacture capable of resisting erosion and surface scratching caused by abrasive particles, expansion and contraction due to uneven heating and the corrosive effects of chemicals (col. 3: 8-20 and col. 5: 50-61).

Claim 2: The rejection is as set forth above in claim 1wherein further Lemelson in Figure 3 discloses a doped coating being doped with foreign atoms comprising one of foreign atoms of the main groups of the periodic table of elements and foreign atoms of the side groups of the periodic table of elements (col. 2: 34-42; and col. 4: 58-col. 5: 8).

Claim 3: The rejection is as set forth above in claim 1 wherein further Lemelson in Figure 3 discloses a doped coating being doped with at least one of the Ti and W (col. 2: 34-42; and col. 4: 58-col. 5: 8).

Claim 4: The rejection is as set forth above in claim 1 wherein further Lemelson in Figure 3 discloses a doped coating being doped with at least one of B and Fe (col. 2: 34-42; and col. 4: 58-col. 5: 8).

Claims 5-8: The rejection is as set forth above in claims 1, 3 and 4. However, Lemelson does not disclose the doped coating having between more than 0% and 35% foreign atoms, **as recited in claim 5**; the doped coating having between 10 and 20% foreign atoms, **as recited in claim 6**; the doped coating having between more than 0% and 35% foreign atoms, **as recited in claim 7**; and, the doped coating having between 10 and 20% foreign atoms, **as recited in claim 8**.

However, Lemelson discloses on col. 4: 58-col. 5: 8 "The coating material may be varied in its properties by adding select amounts of one or more other elements to either the solid, liquid and/or vaporous or gaseous carbon atom containing molecules applied to the rim portion 12 to form diamond-like materials doped or compounded with such other elements which may comprise nitrogen and/or one or more various metals such as aluminum, silicon, titanium, tungsten, etc. A controlled radiation beam, such as a laser beam or plurality of such beams may be employed to effect one or more of the functions of depositing the one or more coating materials, ion implanting one or more materials in the coating or the glass or ceramic material, stripping atoms of carbon from hydrocarbon molecules and depositing such carbon atoms in the

configurations described herein, heating the substrate and bonding the coating material thereto and forming the synthetic diamond or diamond-like material during and/or after deposition takes place."

Therefore, in light of the teaching of Lemelson, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have provided the conductive component of the Adlhart et al. combination with the claimed or any other %foreign atoms depending upon the desired properties of the coating in a controlled manner.

Claim 9: The rejection is as set forth above in claim 1 wherein further Lemelson discloses a doped coating having a layer thickness above 0μm and below 10 μm. In particular, Lemelson on col. 7: 24-29 discloses thicknesses of about 0.000004 in to 0.010 in which equates to 0.1 μm to 2.54 μm which falls within the claimed range.

Claim 10: The rejection is as set forth above in claim 1 wherein further Lemelson discloses a doped coating having a layer thickness in the range from 1 nm to 150 nm. In particular, Lemelson on col. 12: 10-33 discloses "The synthetic diamond coating 51 may be deposited as carbon atoms stripped from molecules of such gas as methane or other hydrocarbon, vaporous hydrocarbon or carbon atom containing material, combinations of gas and vapor carbon atom containing materials, preferably with suitable hydrogen gas mixed therewith to provide suitably efficient deposition and synthetic diamond layer formation to the desired thickness which may vary in the range of 0.000001" to 0.010" and, **for most applications in the range of a few millions of all inch to a few thousandths of an inch."** A few millions of all inch has been construed as at least 3 or more millions of an inch. Accordingly, 3/100000 in (.000003 in) to 5/100000 in (.000005 in) equates to 76 to 127 nm which falls within the claimed range.

Claim 11: The rejection is as set forth above in claim 1 wherein Lemelson discloses a metal comprising titanium, steel, aluminum, an alloy of any of the foregoing (col. 6: 13-23, col. 7: 11-15, col. 7: 63-col. 8: 1, and col. 8: 44).

Claim 12: The rejection is as set forth above in claim 1.

Claim 22: The rejection is as set forth above in claim 1 wherein further Adlhart et al. in Figure 4 disclose a cathode (26) on one side of the electrolyte membrane (27) and an anode (25) on another side of the electrolyte membrane (col. 5: 70-74).

Claim 23: The rejection is as set forth above in claim 1 wherein further Adlhart et al. disclose bipolar plates comprising an intrinsically corrosion resistant and conductive metal. In particular, Adlhart et al. on col. 3: 64-73 disclose titanium, aluminum, and magnesium which are the same as those instantly disclosed as intrinsically corrosion resistant and conductive metals.

Claim 24: The rejection is as set forth above in claims 1 and 23 wherein further Lemelson teaches steel coated with doped diamond coating or doped diamond-like carbon coating (col. 7: 11-15 and 63-67, col. 8: 44-48, and col. 12: 34-36).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the bipolar plate of Adlhart et al. by substituting the aluminum provided with a protective coating with steel-doped diamond coating or doped diamond-like carbon coating of Lemelson because Lemelson teaches a coated steel substrate that would have provided new and improved structures in articles of manufacture capable of resisting erosion and surface scratching caused by abrasive particles, expansion and contraction due to uneven heating and the corrosive effects of chemicals (col. 3: 8-20 and col. 5: 50-61).

Claim 25: The rejection of claim 25 is as set forth above in claim 1 wherein further Adlhart et al. disclose bipolar plates comprising an intrinsically corrosion resistant and conductive metal, and gas supply openings (entry) and discharge openings (outlet) (see col. 6: 4-8). In particular, Adlhart et al. on col. 3: 64-73 disclose titanium, aluminum, and magnesium which are the same as those instantly disclosed as intrinsically corrosion resistant and conductive metals.

Claim 26: The rejection of claim 26 is as set forth above in claims 2-4.

Claim 27: The rejection is as set forth above in claim 25 wherein further Lemelson teaches steel coated with doped diamond coating or doped diamond-like carbon coating (col. 7: 11-15 and 63-67, col. 8: 44-48, and col. 12: 34-36).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the bipolar plate of Adlhart et al. by substituting the aluminum provided with a protective coating with steel-doped diamond coating or doped diamond-like carbon coating of Lemelson because Lemelson teaches a coated steel substrate that would have provided new and improved structures in articles of manufacture capable of resisting erosion and surface scratching caused by abrasive particles, expansion and contraction due to uneven heating and the corrosive effects of chemicals (col. 3: 8-20 and col. 5: 50-61).

(10) Response to Argument

1. One skilled in the art would not have been motivated to combine Adlhart et al. '913 and Lemelson '941 as of the filing date.

The Applicant argues, "Lemelson '941 discloses numerous products on which a diamond-like material may be deposited. However, of the estimated 100 plus possible products on which such a coating might be deposited, Lemelson never suggests placing such a coating on a fuel cell bipolar plate. Further, there is no evidence that Lemelson reduced any of these numerous possible devices to practice. The Lemelson disclosure is so broad that the statements therein can only be viewed as pure speculation. Notwithstanding the speculative nature of the disclosure, none of the disclosed devices suggest "a doped diamond coating or a doped diamond-like coating" on or over a fuel cell bipolar plate as recited in independent claims 1 and 25. There is no disclosure of a fuel cell bipolar plate in Lemelson and there is no suggestion that Lemelson coating could be substituted for other known fuel cell bipolar plate coatings with a reasonable expectation of success."

In response, Adlhart et al. disclose coating a fuel cell bipolar plate constructed of e.g. aluminum with an anticorrosive material e.g. gold or other suitable materials wherein the material is non-limiting and can be selected by one skilled in the art (col. 3:8-17 and 64-73). Lemelson also discloses coating surfaces e.g. aluminum with an anticorrosive material, specifically a doped diamond coating (see e.g. col. 8: 44-48).

In addition, the Examiner has relied upon Lemelson for its teaching that it is known in the art to coat surfaces similar in their material of construction to that taught in Adelhart et al. with an anticorrosive material.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the gold coating of Adlhart et al. with the doped diamond

coating of Lemelson because both are concerned with coating an aluminum surface with an anticorrosive material.

2. The proposed combination and modification necessary to arrive at Appellant's invention is impermissible because such would render Adlhart et al. '913 unsatisfactory for its intended purpose.

The Applicant also argues, "... Thus, in order for the electrode to still function, the Lemelson synthetic diamond coating over the electrode must be porous to ensure that the reactant gases can flow through the synthetic diamond coating and into the electrode. "

In response, the claim does not require coating the electrode. However, the porous nature of the coating on the electrode appears to be due to the porosity of the electrode material and not the coating itself. There is not teaching or suggestion in Lemelson that the coating is porous.

Accordingly, substituting the coating of Adlhart et al. with the coating of Lemelson would not appear to result in a bipolar plate coated with a porous synthetic doped diamond coating.

3. Both Lemelson '941 and Adlhart et al. '913 teach away from the proposed combination and modification.

Applicant argues, "...Because no equivalency between a gold coating and a doped diamond coating has been established with respect to the use of such coatings in a fuel cell environment, the Adlhart '913 teaching of the use of a gold-coated aluminum material for bipolar plates actually teaches away from Applicant's claimed invention.

In response, both Adlhart et al. and Lemelson are coating an aluminum surface with an anticorrosvie material wherein the material of Adlhart et al. is non-limiting.

Accordingly, the Examiner has relied upon the teaching of Lemelson that it is known in the art to coat similar materials of construction with anticorrosive coatings.

Therefore, substituting the coating of Adlhart et al. with the coating of Lemelson would result in a bipolar plate coated with a doped diamond coating.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Thomas H. Parsons

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SUPERVISORY PATENT EXAMINER

Conferees:

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